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**TITANIFEROUS GARNET.**

BY H. A. KELLER.

At Darby, in an almost horizontal rock-stratum, I found the following very interesting occurrence of what seemed at first sight black garnets. The stratum itself is a very much weathered mica schist, 6 to 7 inches in thickness, which contains this often very much decomposed mineral as harder aggregations. The stratum is enclosed by two layers of milky quartz, each about 2 inches in thickness, to which harder less decomposed crystals of a rhombic dodecahedral shape firmly adhere. These very hard crystals are usually of a jet-black color, with vitreous, sometimes metallic lustre, passing however often into the very characteristic reddish-brown garnet substance.

The specimens I found are therefore of two kinds: 1. The very much decomposed aggregations found in the midst of the mica schist. These consist of loose granules of still unaltered garnet mixed with the separated  $\text{SiO}_2$ . They are only imperfectly held together by cohesion. 2. The hard, jet-black, sometimes partly brown crystals ( $\infty 0$ ) firmly attached to the quartz lying above and below the hydromuscovite. Their hardness is 7, sp. gr. 4.25, they have no streak and are not magnetic, but possess a most remarkable cleavage parallel to the dodecahedral faces. Their composition,

$\text{SiO}_2$	.	.	.	.	.	.	.	.	36.92
$\text{TiO}_2$	.	.	.	.	.	.	.	.	1.14
$\text{FeO}$	.	.	.	.	.	.	.	.	27.36
$\text{Fe}_2\text{O}_3$	.	.	.	.	.	.	.	.	3.74
$\text{Al}_2\text{O}_3$	.	.	.	.	.	.	.	.	26.54
$\text{MnO}$	.	.	.	.	.	.	.	.	.33
$\text{CaO}$	.	.	.	.	.	.	.	.	2.76
$\text{MgO}$	.	.	.	.	.	.	.	.	1.66
									<hr/> 100.45

together with their appearance under the microscope, shows that there is a very intimate dissemination of a Ti Fe mineral in the garnet substance. Many of these crystals have from within become partially altered, so much so as to have often formed inside of even the hardest ones small but well-crystallized spenes, others have changed into asbestos, mica, quartz, and even pyrite.

Their outer shape has generally by transformation become partially lost in the surrounding hydromuscovite. The Ti has probably been furnished by the two quartz strata, as I have observed, only a few feet distant, many other pieces of quartz impregnated with the same black mineral, while the enveloping strata were perfectly free from it, or had it only partly remaining as the more insoluble  $\text{FeS}_2$ .

OCTOBER 24, 1881.

*Pyrophyllite and Alunogen in Coal-mines.*—Mr. ELI S. REINHOLD made the following communication :

About two years ago the writer discovered in the coal slates of the North Mahanoy colliery, near Mahanoy City, Schuylkill County, an interesting mineral which, in its determination, defied the ordinary tests based on physical characters. A chemical analysis by Dr. F. A. Genth proved it to be an interesting variety of pyrophyllite. His report to the American Philosophical Society gives the results of the analysis, together with information as to occurrence, etc.

Attention is here called to that report for two reasons: First, for the purpose of making a correction; and, second, for a possible connection between pyrophyllite and the recently discovered alunogen.

When the writer furnished Dr. Genth with information regarding the pyrophyllite, he stated that it was found in but *one vein, of only one mine*. He has since found it at four different collieries, and coming from, at least, three different coal-veins.

*Alunogen.*—In a valley extending northeast from Mahanoy City, a distance of about a mile, are a number of collieries. A stream of water flows through it, receiving the mine-water from several of these collieries. During heavy rains the stream overflows its banks and covers a large area with the sulphur-water. The writer noticed, last spring, after the water had subsided, a white mineral coating the surface recently inundated. This mineral proves to be alunogen. In this efflorescent form it has been more abundant this summer than before.

As foreign mineralogists have noted the occurrence of this mineral in the coal-slates of Bohemia, Bavaria and England, and as the same mineral is common in our own State, as an efflorescence where iron-sulphide comes in contact with clay, its discovery here in the anthracite coal region may be regarded quite natural rather than surprising. However, there is a hint at a different origin of the alunogen found here from that ordinarily given. Instead of it being the result of the sulphur contained in the mine-water uniting with the alumina of the slate, the writer is inclined to think that the latter constituent is furnished by the